

Method for the manufacture of a meat-based food product  
and a meat-based food product

This invention relates to a method for the manufacture of a meat-based food product and a meat-based product.

As the non-statutory guidelines of the German Food Book state all animal parts adapted to be eaten by man are defined as meat. This also encompasses organs, blood, bones, and skin in addition to muscular and adipose tissues. Also included are the preparations and processing types thereof.

"Meat products" is a general merchandise technological term which is laid down in the non-statutory guidelines of the German Food Book (Meat and Meat Products). Accordingly, meat products are products which exclusively or predominantly (at least at 50 %) are composed of meat. Meat includes all parts of butchered or shot-dead animals which are destined for consumption by man.

A meat product (in contrast to meat) is spoken of whenever meat is prepared, which involves a treatment having an effect on its preservability in most cases. Above all, this includes heating (e.g. cooked escalopes, boiling sausage), souring (e.g. spiced vinegar marinated beef), curing and salting (e.g. raw ham), and drying (e.g. fermented sausage), but does not include any cold treatment (refrigerating, freezing) because this will act solely as long as it is directly applied.

A distinction is made between piece goods and mingled goods in meat products. Piece goods include raw cured goods (e.g. rolled bacon joint) and boiled cure goods (e.g. boiled ham). Mingled goods include sausages, piece-cut meat (e.g. goulash), and minced meat (burger meat).

As is stated in the non-statutory guidelines of the German Food Book (Meat and Meat Products) restructured-meat products which are made from meat pieces after a mechanical pre-treatment to release muscle protein on the surfaces while opening up the structure at the same time (e.g. by shaking or tumbling) are also made using cooking salt or nitrite curing salt. They are assembled to form a larger unit (piece goods); they will maintain their new shape due to heating or freezing

treatment. The tissue compound of the meat pieces used substantially is maintained. Whatever their required salt content might possibly be during manufacture, restructured-meat products will be of the same composition as are grown-meat products after which they have been modelled. The muscular abrasion occurring during manufacture (a sausage meat-like substance forming from released muscle protein), unless otherwise stated in the guidelines, does not exceed the rate of 5 % by volume (10 % by volume for poultry meat products) in the assembled, ready-to-eat meat proportion. No minced, chopped or similarly comminuted meat is used in manufacture.

In order to avoid a confusion of restructured-meat products with comparable products made from grown meat the word "restructured meat" is put in front in the marketing term and, moreover, a notice is made in a direct connection with the marketed brand and in letters of the same letter, stating that meat pieces are assembled (e.g. restructured-meat ham assembled from meat pieces, restructured-meat rolls assembled from meat pieces, restructured-meat goulash assembled from meat pieces).

Grown meat or on-the-piece meat is such as is grown on the animal body, particularly with regard to its appearance, composition, structure, and taste. A disadvantage is that it is available only in an anatomically predetermined shape, e.g. as a fillet, steak, chop, brisket, leg portions, brisket fillet or another cut piece of meat. Restructured meat, in contrast, may be brought into virtually any shape, but differs from grown meat or pieced meat with regard to its constitution.

FR-A-2 707 460, WO-A-96/23416, US-A-3 537 864 disclose methods for the manufacture of food products wherein cut-up meat is frozen in a mould after marinading. The frozen meat may be sliced for consumption.

WO-A-97/10717 relates to the squeezing of individual meat products between two refrigerated contact surfaces in order to achieve a food product of a uniform thickness profile.

US-A-3 924 295 relates to a method for forming meat products by generating a sticky exudate on the surface and freezing and expanding meat pieces in a mould. The resultant food product may be sliced for packaging, distribution, and consumption.

EP-A-0 181 024 relates to a method for processing poultry wherein poultry meat pieces are marinated and provided with a coating. The resultant food products are meant for consumption directly after they are heated.

EP-A-0 565 222 relates to a frozen and coated fish product which has a multiplicity of alternating layers of fish material and layers of eatable material and at least one non-coated side, and to a method for the manufacture of such a product. The product uniformly is of the shape of a rectangular slab.

Therefore, it is the object of the invention to provide a method for the manufacture of a novel meat-based food product and a novel meat-based food product.

The object is achieved by the features of claim 1 and by a food product having the features of claim 24.

- In the inventive method for the manufacture of a meat-based food product,
- . whole grown meat is tumbled in a liquid marinade,
  - . the tumbled meat is formed into at least one restructured body comprising several pieces of whole grown meat,
  - . the restructured body is frozen, and
  - . the restructured body, a portioned body obtained by sawing up the restructured body or another portion piece of the restructured body, when frozen or deep-frozen, are gently pressed into a mold in order to assume a form corresponding to that of the mould.

Advantageous aspects of the method are given in the sub-claims 2 to 23.

The inventive meat-based food product is manufactured according to the method of any one of claims 1 to 23.

The inventive technology, unlike the technology for the manufacture of restructured meat, does not rely on comminuted or cut-up meat pieces. Rather, it employs whole grown meat, i.e. anatomically grown meat bodies which are such as are grown on the body of the butchered animal, i.e. in which the natural run and cohesion of muscles is maintained. The meat concerned may be so-called "meat portion pieces", specifically fillet, sirloin, ham, brisket, leg portions or brisket fillet which are clearly defined and assigned anatomically in the food technology and law.

In tumbling, liquid marinade is fed to the meat and is worked into it. As a rule, tumbling is done in a drum with built-in devices which gently act on the goods being treated while the drum rotates.

The restructured body, for example, may be a cylinder, a ball, a block or a plate. The meat may be shaped and frozen in succession or simultaneously or the processes may overlap in time. Preferably, the restructured body may be deep-frozen with the temperatures being in the range from  $-15^{\circ}\text{C}$  to  $-18^{\circ}\text{C}$ .

Surprisingly, the restructured body stays together with no need to add thickeners, stabilizers or the like. The marinading and shaping of the meat into a restructured body can be done very gently and allows to season the food product in an advantageous manner. As a result, the structure, particularly the cellular, muscular and fibrous structure of the grown meat, is completely maintained in the meat forming the restructured body. The food product has a better appearance, a better texture, can be bitten into better than can restructured-meat products, and has a taste corresponding to that of a naturally grown meat in the "eating event". Hence, the food product has the sensory characteristics of grown meat, but has the advantages of restructured meat in regard of its shape without meeting the definition of restructured meat. As a consequence, calibration may be performed more precisely than in one-piece grown meat. In addition, it helps achieve restructured-meat bodies with dimensions significantly exceeding the sizes of grown meat, which facilitates further processing. On the other hand, the inventive product does not have

the value-reducing sausage meat mass proportion of restructured-meat products because of its gentle manufacture.

The meat types used are poultry, pork, beef, veal, mutton, lamb, horse, goat or game or combinations of several different meat types. The poultry meat, in particular, may be young chicken, hen, turkey, duck or goose. The piece portions used are, in particular, fillet or inner fillet. Young chicken breast fillet and/or young chicken inner fillet are particularly advantageous because when tumbled in a liquid marinade it will have a particularly strong stickiness and, moreover, is particularly tender and tasty. It is preferred to use a boneless meat for the reason that it is easily processable and is a high-quality product.

In the food technology, marinades are used as sour, spice-containing infusion to pickle food therein. It is preferred that a liquid marinade is used which contains spices and/or salt and/or water and/or an oil-in-water emulsion and/or a water-in-oil emulsion and/or vinegar and/or wine.

It is preferred that the tumbled meat is formed into at least one slab. A plate freezer may be employed to shape and freeze it. Plate freezers have a multiplicity of parallel plates in which channels extend for refrigerant. Gaps which are formed between the plates to receive the frozen product may be reduced in number by means of a hydraulic cylinder. There are plate freezers where the plates are in horizontal and vertical positions. They are mainly used to freeze fish fillet, whole fishes in blocks as well as flowable substances (dairy cream, egg yolk). If the plates are disposed vertically the tumbled meat may be placed on the upper openings of the gap. Upon penetration into the gap, these will be reduced in number by actuating the hydraulic cylinders and the slabs thus formed are deep-frozen.

The frozen slabs are suitable for use, in particular, in large-scale catering establishments or other subsequent processing facilities. Preferably, they are sawn up into smaller portioned bodies. A band saw may be used here. It is preferred that the slabs initially are sawn up in parallel with its main directions of extension and

then are sawn up vertically to its main directions of extension. The size and weight of the portioned slabs are chosen so as to meet the purpose, specifically with regard to their uses (e.g. as a side dish, a semi-ready meal or ready meal) and the number of people (e.g. a portion for a single person, a family or a large-scale consumer).

The further processing of the at least one restructured body or portioned body may consist in that a moisture-containing, eatable mass is applied to one side as a topping and the restructured body or portioned body is frozen along with the topping. The topping may cover at least one side of the restructured body or portioned body more or less. Freezing causes the eatable mass to get into a connection with the restructured body or portioned body, which possibly is promoted by an interaction between ice crystals that form in the eatable mass and exist in the restructured body or portioned body.

The topping may serve as a decoration and/or a seasoning for the meat and/or a taste improver and/or as a side dish and/or a means to improve the sensation in biting. In particular, it may comprise vegetables and/or fruits and/or fat and/or sour cream and/or wheat flour and/or panada and/or seasonings. Its ingredients may be made available, weighed and chopped and, then, may be placed on the slab or portioned slab. Preferably, the mass is placed on the restructured body or portioned body in a refrigerated condition in order to restrict any multiplication of microorganisms. It is preferred that the temperature of the mass ranges between 10 °C and 0 °C.

According to another aspect, another eatable mass can be placed on the topping as a further topping. The further topping may serve, in particular, as a decoration or a means to act more on taste and may comprise, for example, cheese and/or herbs and/or roast or possibly seasoned bread bits.

It is preferred that the mass and/or further mass is deposited onto passing-through restructured bodies and/or passing-through portioned bodies by means of a

filling mechanism. To this end, the filling mechanism may have a slit die and/or a spraying device.

The restructured body, the portioned body, the portioned slab or another portions piece of the restructured body are gently pressed into a mould in a frozen condition or preferably a deep-frozen condition in order to make it assume a shape corresponding to the mould. For example, this can be done by means of a die. In this manner, the food product may virtually be given any shape, even an irregular one. Thus, the food product may be given the shape of a meat portion piece such as the one of a young chicken bristlet fillet.

If work is done with a mould and an associated die there is a danger that residues will be formed when the die closes the cross-section of the mould. This is avoided, according to an advantageous aspect in which the volume of the restructured body or portioned body is adapted to match the volume of the mould so that the restructured body or portioned body fills the mould cavity, at the earliest, at a point where a die closes the cross-section. For this purpose, the restructured body or portioned body preferably has a volume which is less than that of the mould.

The product gently formed in the mould or "shaped" has the advantages already described for the food product. In particular, the structure of the grown meat is maintained. However, the shaped product additionally has a better appearance as compared to conventional structured-meat products, a better texture and a better sensation in biting, and virtually perfectly corresponds to a naturally grown meat in an "eating event".